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(71)(72) Applicant and Inventor: OLIVER, Stuart, McCornack [US/US]; 1320 Hibiscus Street, Oxnard, CA 93030 (US).

(74) Agents: WATT, Phillip, H. et al.; Fitch, Even, Tabin, Flannery & Welsh, Room 900, 135 South La Salle Street, Chicago, IL 60603 (US).

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(54) Title: FLAVORING SYSTEM FOR SODIUM REDUCED FOODS

(57) Abstract

Flavoring systems for low sodium and sodium reduced foods comprising a flavor enhancing and binding element such as safflower florets or an extract thereof or its taste equivalent in combination with non-sodium inorganic salts, one of which is a chloride and one or more organic acids, and/or salts thereof.

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FLAVORING SYSTEM FOR SODIUM REDUCED FOODS

It is well known that a large portion of the population suffers from a sodium intolerance perhaps as high as 20% of the population is so afflicted. Excessive sodium intake as salt or in other forms by these individuals can precipitate or aggravate hypertension, cardiac conditions, and renal conditions in these people.

Salt hunger definitely occurs in people who have been accustomed to a standard diet in the United States and who are required to shift to a low sodium diet for medical reasons. Most low sodium flavoring systems used up to this time either impart a disagreeable aftertaste to the food or are too bland to suit the taste of a person accustomed to the usual diet.

There are also medical contraindications for the use of large amounts of substances such as potassium chloride and ammonium chloride by many individuals. There are a variety of flavors which will reduce the blandness of a food. These include the salt flavor, sourness, and the hot and pepperlike seasonings. There is seemingly only one substance which produces the exact onset of the "salt" flavor preferred by humans. This is sodium chloride.

The most closely similar compounds to this which are sufficiently non-toxic for use as a seasoning have undesirable side and after flavor notes. It has been found that very small quantities of alternative inorganic salts such as potassium chloride, ammonium chloride, etc. can be compounded with organic salts, organic acids, and certain complex organic flavor binding and enhancing agents to provide a flavoring system which will simulate the flavor notes of sodium chloride in food sufficiently well to permit creation of dishes which have an extremely low quantity of sodium in them, and yet, which will not appear flat and

flavorless even to a salt accustomed palate. Some tested formulations indicate that the flavoring systems may even be built in some cases as enhancing systems for naturally occurring sodium chloride to synergistically provide a full and saltlike flavor.

This invention relates in general to the art of food seasoning compositions and more particularly to producing a gustatory sensation approximating that of sodium chloride (salt) without the use of sodium chloride.

Prior art teaches the use of potassium chloride and certain ammonium salts to simulate the taste of sodium chloride. It also teaches the use of potassium chloride (KCl) in the presence of such salts as the mono-potassium salt of glutamic acid. Other prior art teaches the use of substances which deaden the ability of the taste buds to sense a bitter taste. Still further prior art teaches the use of yeast hydrolysates to give body to salt substitutes. Miller (U.S. Patent 3,505,082) teaches the use of an organic acid (fumaric acid) to reduce aftertaste.

The present invention teaches the use of an inorganic chloride such as but not limited to potassium chloride in conjunction with another non-sodium inorganic salt such as but not limited to aluminum ammonium sulfate (ammonium alum) and one or more organic acids such as but not limited to acetic acid, citric acid, ascorbic acid, and/or salts thereof, the above all in the presence of a flavor binding and/or enhancing substance such as but not limited to safflower florets or an extract of safflower florets, or one or more components thereof (not yet specifically identified).

One alternative binding or enhancing agent already identified is an extract of tamarind fruit. This is especially useful in dishes based on chicken or other fowl.

The present invention differs from prior art in that levels of inorganic chlorides can be much reduced from those required with the prior art systems. The elements which appear to be required for the flavoring system to develop a full and saltlike flavor note are:

1. A flavor enhancing and binding element such as safflower (the florets or an extract thereof) or its taste equivalent.
2. A chloride salt in trace quantities.
3. An inorganic acid and/or salt thereof.
4. Trace quantities of other inorganic ions to modify the flavor notes may be used to fully develop the flavor system.

There is a surprising and unexpected aspect to this discovery in that satisfactory salt-like flavors are developed with much lower levels of chloride and metallic salt levels than are customarily used. Unpleasant flavor notes are reduced to an even lower level that with the art taught by Miller in U.S. Patent 3,505,082, and the required levels of potassium and other sometimes undesirable ions required to develop the full flavor system are reduced below the levels taught by either Miller or Allen in U.S. Patent 4,216,244.

A preferred embodiment of the present flavoring system is based on a composition as follows for the key ingredients:

1. Safflower (the florets - as milled spice, extract, or dried extract)	30%
2. Ascorbic acid	23%
3. Citric acid	18%
4. Potassium chloride	22%
5. Ammonium alum	6%

The exact proportions are not critical and can be varied widely depending upon the desired effect, from sensible percentages to trace percentages. By trace

percentages is meant any substance present in lesser quantities than major constituents - such as materials present in ratios of 1:10 or even 1:5 of the amounts of one of the major constituents. The preferred embodiment shown is one which has been used successfully in a wide variety of recipes. The primary teaching of this invention is, however, carried in the four key points which end the section on background.

The full and salt-like flavor is developed by a combination of these elements which synergetically synthesizes a gustatory effect which alleviates salt hunger. The blending and enhancing agents which may be used to fulfill the requirements of point No. 1 include, but are not limited to Safflower (Mexican Saffron or the floret of the plant Carthimus Tinctorus) and an extract of tamarind fruit. Certain other complex organic systems appear to have similar effects.

There are several ways of manufacturing the flavor system. The simplest would be to mill together safflower florets with suitable amounts of ascorbic acid, citric acid, ammonium alum, and KCl in powder or crystalline forms. In more sophisticated manufacturing systems, the ingredients (including safflower extract) can be plated up on either a self or a filler substrate from solution. For example, safflower, KCl, ascorbic acid, and ammonium alum can be plated onto citric acid crystal. All of the ingredients can be plated onto a cereal substrate. Such plating processes can be done in liquid solution, in gas or air, or in vacuum.

Example 1

Flavor system for cucumber pickles and the like:

vinegar (200 grain)	0.5 cup
potassium chloride	57.27 grains
dill seed	92.59 grains
garlic powder	56.15 grains
bay leaf	4 grains

corriander	55.6 grains
oregano	23.26 grains
marjoram	10.96 grains
safflower tincture	1.02 ml
carroway	28.88 grains
ammonium alum	43.31 grains
water (distilled)	1.5 cups
dill oil	0.05 ml
garlic oil	0.03 ml
mustard oil	3 drops
crushed pepper	10.7 grains
mixed spice	10 grains

Comments: The above are simmered together, covered, until the flavoring matter is well distributed into the liquid. This is sufficient flavoring matter for 2 pounds of cucumber fruit. The entire mass may be added to the fruit as a pickling brine, or the spices may be strained out to leave a clear flavor brine. The best pickle pack includes sliced onion with the cucumber fruit.

EXAMPLE II

Specific examples of uses of the proprietary compositions include:

Salsa

2 pounds diced tomatillo
3 toes garlic, diced
3 tomatoes, diced
2 passalla chiles, chopped
2 jalapino chiles, chopped
1 teaspoon corn starch #
1 teaspoon Mexican saffron (safflower floret) *
1/8 teaspoon citric acid *
1/8 teaspoon ascorbic acid *
1/8 teaspoon potassium chloride salt substitute *
1 teaspoon chile powder

3 tablespoons vinegar *

1 teaspoon Worchestershire sauce

Comments: Here we have a recipe containing about 3 to 4 pounds of ingredients (roughly 1300 to 2000 grams weight, depending on exact ratios used), with about 12.5 grains or 0.162 grams of safflower (0.01%) and about 0.5 grans of KCl, which is about 0.03%.

Items marked * are components of the proprietary flavor system.

Item marked # is suitable for use as an extender or substrate.

Chicken/Broccoli Aspic

1 pound broccoli, chopped

1 large onion, chopped

1 toe garlic, chopped

cook in 1 cup water and 1/4 cup vinegar *

1/2 teaspoon Mexican saffron *

Boil for 7 minutes, reserve liquid. Add strong chicken stock and water to make 1 1/2 pints, add two envelopes of unflavored gelatin and bring to near boil. Mix vegetables with liquid, blend in 1 cup yogurt in blender. Set in refrigerator in molds.

Comments: This is an instance of using trace amounts of naturally occurring chloride in the form of salt in the chicken to provide sufficient chloride to carry the note. There is also calcium in the yogurt, and there are other organic acid agents in the yogurt. With this, we have a "no-sodium added" recipe which does not require added inorganic ions to generate the flavor.

EXAMPLE III

Zucchini Chutney

1 pound zucchini

3 tablespoons wine vinegar

1/2 cup white vinegar

1/4 teaspoon ammonium alum

3 tablespoons raisins

1 cup seedless grapes
1/2 teaspoon dry mustard
1/2 teaspoon Sugar Twin (TM)
1/2 onion (cut fine)
1/4 teaspoon potassium chloride
1/4 teaspoon garlic powder
2 (small) Italian tomatoes
1 (medium) red bell pepper
1/2 teaspoon chile powder
1/4 teaspoon paprika
1/2 teaspoon tumeric
6 dashes Angostura Bitters (TM)
3 teaspoons sugar

Simmer covered for 20 minutes, jar, cool, and refrigerate.

Comments: This recipe in some way develops the enhancing and binding element to a point where it tastes nearly as salty as some salted mango chutneys.

CLAIMS:

1. A sodium-free or low sodium composition for providing the saline gustatory sensation to foods, said composition comprising:

(1a) a flavor enhancing and binding component,

(1b) a chloride salt component in quantity less than 90% by weight of the composition;

(1c) an organic salt component.

2. The composition in Claim 1 wherein said gustatory sensation is not dependent on the condition in which a metallic or chloride salt is the predominant material in the composition.

3. The composition in Claim 1 wherein said enhancing and binding element includes:

(3a) safflower floret or an extract thereof; and wherein said chloride salt includes:

(3b) potassium chloride; and wherein said organic salt includes:

(3c) an acid of said organic salt.

4. The composition of Claim 1 wherein said components (1a), (1b), and (1c) occur such that one component comprises the major percentage by weight of the composition.

5. The composition of Claim 4 wherein the weight ratio between any two components is established in the range of from 1:1 to 1:0.01 between said two components.

6. A flavoring composition, for addition to foods, said composition comprising:

(6a) a flavor enhancing and binding substance such as safflower floret or an extractive thereof;

(6b) a chloride salt;

(6c) an organic acid and/or salt thereof;

(6d) sensible or trace quantities of inorganic ions of the classes designated as alums and/or acid formers.

7. The composition of Claim 6 which includes additional components, said additional components including any one component or combinations of components which include but are not limited to:

(7a) edible oils;

(7b) spices;

(7c) extracts.

8. A dry seasoning reduced sodium salt-substitute composition comprising:

(8a) a flavor enhancing and binding substance;

(8b) at least one chloride salt;

(8c) at least one organic acid and/or salt thereof.

9. The composition of Claim 8 wherein said enhancing and binding substance includes:

(9a) safflower floret or extractives thereof.

10. The composition of Claim 8 wherein said enhancing and binding substance includes:

(10a) synthetic flavor equivalents of safflower.

11. The composition of Claim 8 which includes:

(11a) flavor-modifying inorganic ions.

12. The composition of Claim 8 wherein said enhancing and binding substance includes:

(12a) the juice or extractives of the tamarind fruit.

13. The composition of Claim 12 which includes:

(13a) inorganic flavor enhancing ions.

14. The composition of Claim 8 which includes:

(14a) extra flavoring elements.

15. The composition of Claim 14 wherein said extra flavoring elements include any one of, or a combination of the following: garlic, onion, spices, and herbs.

16. The composition of Claim 15 which includes:

(16a) inert extenders.

17. The composition of Claim 8 wherein said

composition is produced in liquid condition.

18. A low-sodium flavoring composition for chutneys, relishes, pickles, and the like, said composition including:

(18a) a flavor enhancing and binding agent;

(18b) an organic acid agent;

(18c) a chloride agent.

19. The composition of Claim 18 wherein said enhancing and binding agent includes one or a plurality of the following substances:

zucchini	raisins	seedless grapes
dry mustard	onion	garlic
tomato	bell pepper	chili powder
paprika	tumeric	angostura bitters
bitters	saccharin	dextrose
sucrose	fructose	

20. The composition of Claim 18 wherein said organic acid agent includes one or a plurality of the following substances: acetic acid; vegetable acids; fruit acids.

21. The composition of Claim 18 wherein said chloride agent includes: mixed chlorides.

22. The composition of Claim 18 which includes: flavor modifiers such as ammonium alum and/or related inorganic salts.

23. A low-sodium flavor base for pickles, said flavor base comprising:

(23a) a flavor enhancing and binding agent;

(23b) a chloride agent;

(23c) an organic acid.

24. The flavor base of Claim 23 wherein said enhancing and binding agent includes:

(24a) safflower floret or an extractive thereof.

25. The flavor base of Claim 23 wherein said chloride agent includes any one or a plurality of:

(25a) potassium chloride;

(25b) calcium chloride;

(25c) mixed chlorides.

26. The flavor base of Claim 23 wherein said organic acid is combined or mixed with seasoning from the group which may include:

whole spice extractives oleoresins synthetics oils.

27. The flavor base of Claim 23 wherein said organic acid is mixed or combined with seasoning from the group which may include:

dill	carroway	garlic
alum	bay	pepper
corriander	mustard	marjoram
onion	mixed spices	

28. A low-sodium fruit or vegetable composition utilizing the flavor base of Claim 23 as a pickling medium to enable the production of:

(28a) cooked pickles and relishes;

(28b) pasturized pickles and relishes;

(28c) refrigerated pickles and relishes;

(28d) radiation sterilized pickles and relishes.

29. A low-sodium fish or meat composition utilizing the flavor base of Claim 23 as a pickling medium to enable the production of:

(29a) a cooked composition;

(29b) a pasturized composition;

(29c) a refrigerated composition;

(29d) a radiation sterilized composition.

INTERNATIONAL SEARCH REPORT

International Application No PCT/US82/00931

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC [3]

A 23L 1/237

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
US	426/649

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category [15]	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
X	US, A, 2,742,366, PUBLISHED 17 APRIL 1956, POWER.	1,2,4,5,8,11,14 17,18,20,21,23, 25,28,29
X	US, A, 2,968,566, PUBLISHED 17 JANUARY 1961, MUNCH.	1,2,4,5,8,11,14 17,18,20,21,23, 25,28,29
X	US, A, 3,505,082, PUBLISHED 07 APRIL 1970, MILLER.	1,2,4,5,8,11,14 17,18,20,21,23, 25,28,29
X	US, A, 3,782,974, PUBLISHED 01 JANUARY 1974, LONTZ ET AL.	1,2,4,5,8,11,14 17,18,20,21,23, 25,28,29
X	US, A, 4,243,691, PUBLISHED 06 JANUARY 1981, MOHLENKAMP ET AL.	1,2,4,5,8,11,14 17,18,20,21,23, 25,28,29
X,P	US, A, 4,297,375, PUBLISHED 27 OCTOBER 1981, SHACKELFORD.	1,2,4,5,8,11,14 17,18,20,21,23, 25,28,29
Y	NLA, 99,323, PUBLISHED 16 OCTOBER 1961.	15,16,19,26,27
Y	N, FURIA ET AL, FENAROLI'S HANDBOOK OF FLAVOR INGREDIENTS 2nd E'd., 1975, CRC PRESS: CLEVELAND OHIO, USA, VOL. I- PAGES 454,455,473,474.	3,6,7,9,10,12,13 24

* Special categories of cited documents: [16]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [2]
20 SEPTEMBER 1982	15 OCT 1982
International Searching Authority [1]	Signature of Authorized Officer [20]
ISA/USA	JOSEPH M. [illegible]

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

Y	N, HAWLEY, THE CONDENSED CHEMICAL DICTIONARY, 10th EDITION, 1981, VAN NOSTRAND REINHOLD CO.: NEW YORK, USA, PAGE 39.	22
Y	N, WINTER, A CONSUMER'S DICTIONARY OF FOOD ADDITIVES, 1972, CROWN PUBLISHERS: NEW YORK, USA PAGES 26-27.	22

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [10]

This International search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers _____, because they relate to subject matter [12] not required to be searched by this Authority, namely:

2. ☐ Claim numbers _____, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out [13], specifically:

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [11]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.